Radionuclide Regulations, Treatment and Affordability

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Introduction

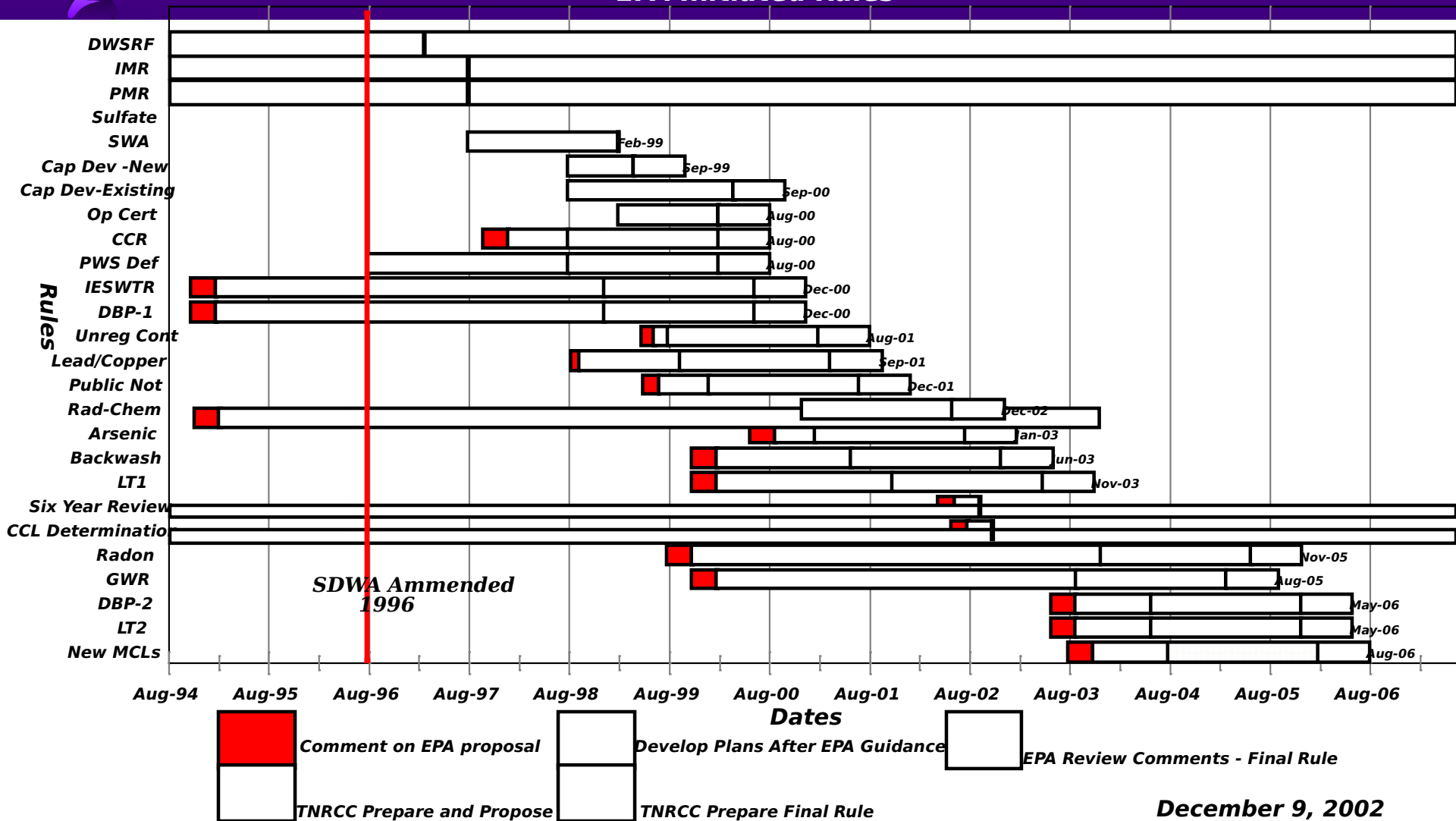
- Rules Schedule
- Radionuclides

Gross Alpha
Radium 226 and 228
Uranium
Gross Beta

- Treatment
- Costs

Rules Adoption

Public Water System Rule Schedule
EPA Initiated Rules



December 9, 2002

Existing Radionuclide Rules

- Gross Alpha 15 pCi/L
- Radium 226 and 228 5pCi/L
- Gross Beta 4 mrem/yr

Radionuclides

(except Radon)

- *EPA published NODA on April 21, 2000*

Maintain current 5 pCi/L for Ra 226/228

Maintain current 15 pCi/L for Gross Alpha

Three options for Uranium MCL at 20, 40 and 80 pCi/L

- *December 7, 2000*

final regs on radium, uranium,

Radionuclides Schedule

- TCEQ Propose Rules May 2004
- TCEQ Final Rules December 2004
- Federal Effective Date December 2003
- TCEQ Effective Date January 2004

Proposed Radionuclide MCLs

- **Gross Alpha**

15 pCi/l - 94 violations

- **Radium 226 & 228**

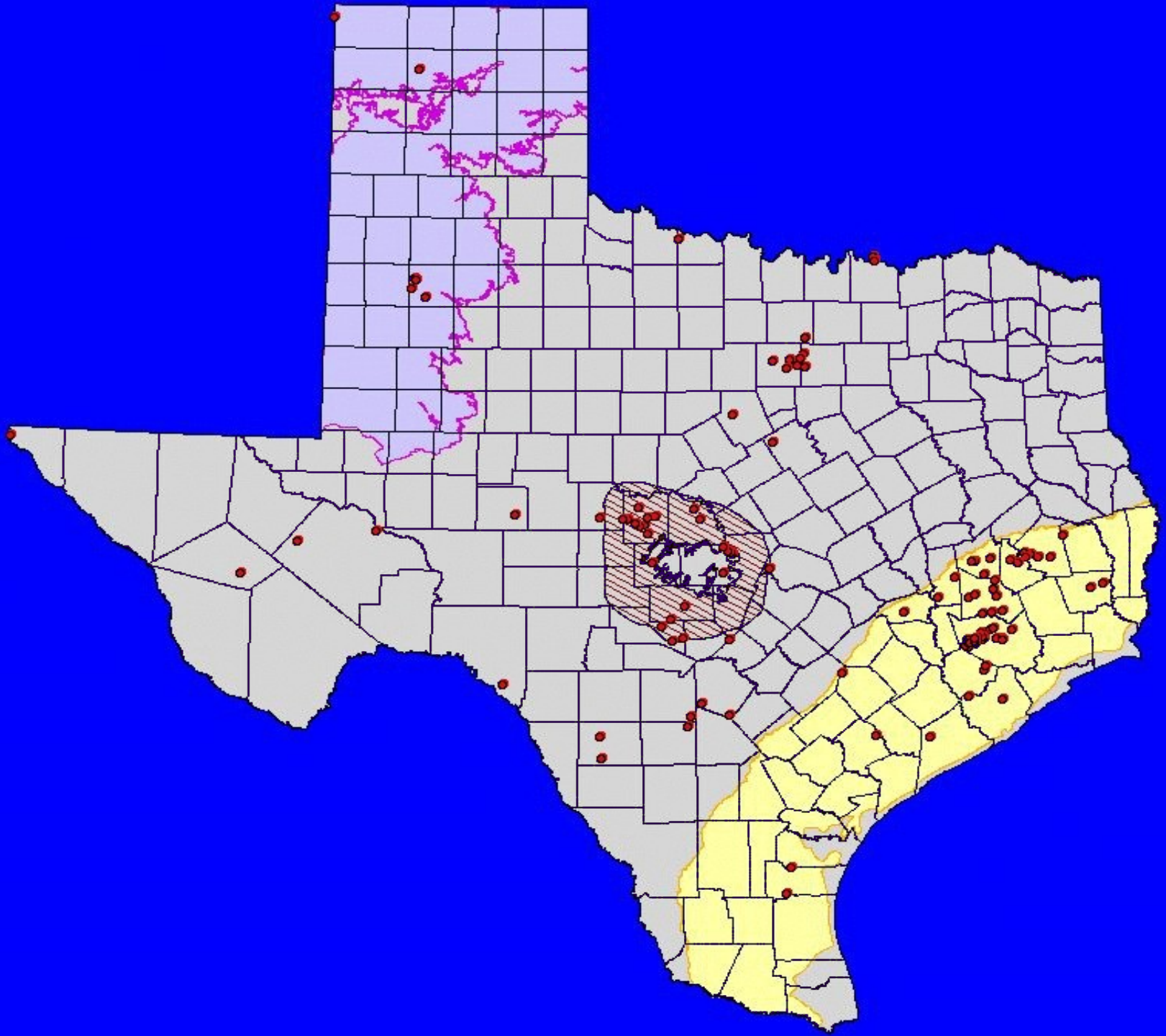
5 pCi/l - 94 violations

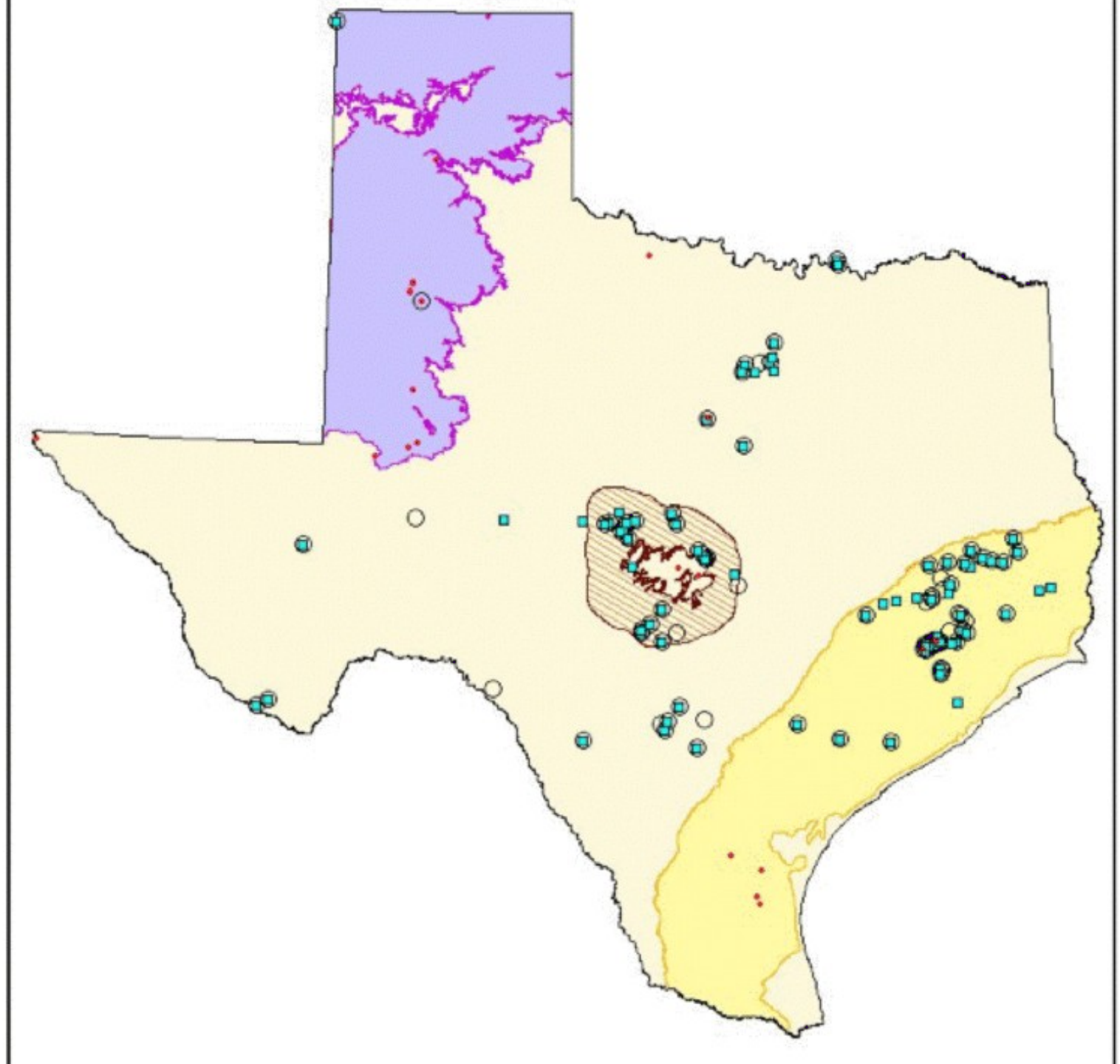
- **Uranium**

30 pCi/l - 23 violations

- **Radon**

300 pCi/l - 850 violations
4000 pCi/l - 50 Violations





Compliance Options

- New/Different Water Source
  - Managing Existing Sources
  - Developing New Sources
  - Purchasing water
- Treatment

Treatment for Radionuclides

- Demineralization
- Ion Exchange
- Lime Softening

Demineralization

- *Membrane process that removes a percent of most soluble inorganics*
- *Produces a "Reject" stream of concentrated contaminants*

Ion Exchange

- Resin adsorption process which exchanges one cation for another
- Produces a "Regeneration" stream of high levels of salt and concentrated contaminants

Lime Softening

- High pH precipitation and removal process
- Produces a “Lime Sludge” which includes concentrated contaminants

No Discharge Contaminant Specific Resins

- Essentially an Ion Exchange process which has a long life
- Produces no onsite discharge or waste
- Resin is removed when "spent" and replaced with

Residuals Management

Liquid Residuals

- Can
  - Discharge to environment
  - Must meet effluent standards (60/60/300)
  - Discharge to Sewage Collection System
  - Must meet effluent standards (600/600/3000)
  - Non Commercial Class I injection well
- Can't
  - Residuals above effluent standards

Residuals Management

- Solid Residuals
  - Can
    - Out of State Licensed NORM Facility
  - Can't
    - In State NORM Waste Facility
    - In State Class I NORM injection well

Treatment Costs

- *Capital Costs*
- *Operation and Maintenance Costs*
- *Residuals Management Costs*

Treatment Costs

- Surveyed Water systems or applied models
- Cost Range (Per Connection)

$1 per month for managing existing sources

$140 per month for small water system RO treatment

- New Treatment Technologies in the range of $10 to $25 per month per Connection

Conclusions

- *Radionuclides are naturally Occurring in Parts of Texas*
- *Radionuclide regulations have recently been revised*
- *New Regulations will create more violations*
- *Several Compliance Options*
- *Treatment options Limited by residuals management options and costs*